WE-210Series

For models WE-210S and WE-210SH

HORIZONTAL METAL CUTTING BAND SAW

*Study Carefully Before Operating

WE-210S

WE-210SH

Specifications

Capacity:			
90°	170mm	170x170mm	210x95mm
45°	120mm	110x110mm	
60°	70mm	60x60mm	

Blade Size 20 x 0.9 x 2110mm

Blade Speed (50Hz) 1PH 4P 80m/min
3PH 4P 80m/min 8P 40m/min
(60Hz) 1PH 4P 315FPM
3PH 4P 315FPM 8P 158FPM

Motor 1HP (0.75kW) 4P 1430RPM (50Hz)
1720RPM (60Hz)

Floor Space (L xWxH)
1500mm x 800mm x 1620mm

Weight NW: 156kgs GW: 170kgs

Container Loads 40sets/20ft 84sets/40ft

P1001-F 10/2006

Contents

Chapter 1
ACCIDENT PREVENTION AND SAFETY REGULATION
1.1 Advice for the Operator 2
1.2 The Electrical Equipment According to European Standard" CENELEC EN 60 204-1" (1992) 2
1.3 Emergencies According to European Standard “CENELEC EN 60 204-1 (1992)” 2

Chapter 2
MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING
2.1 Machine Dimensions 2
2.2 Transportation of Your Machine 3
2.3 Minimum Requirements for Housing the Machine 3
2.4 Anchoring the Machine 3
2.5 Instructions for Assembly of the Loose Parts and Accessories 3
2.6 Deactivation of Machine 3
2.7 Dismantling 3

Chapter 3
THE MACHINE’S FUNCTIONAL PARTS
3.1 The Saw Bow 3
3.2 Controls 4
3.3 Vise Adjustment 4
3.4 Cutting Angle Adjustment 4
3.5 The Base 4

Chapter 4
OPERATING AND ADVICE ON USING YOUR BANDSAW
4.1 The Operation Cycle 5
4.2 Recommendations for Using the Machine 6

Chapter 5
ADJUSTING YOUR MACHINE
5.1 Blade Tension Assembly 6
5.2 Aligning the Flywheel 7
5.3 Checking the Adjustment of the Blade 7
5.4 Adjusting the Blade Guide 7
5.5 Changing the Blade 8

Chapter 6
ROUTINE AND SPECIAL MAINTENANCE
6.1 Daily Maintenance 8
6.2 Weekly Maintenance 8
6.3 Monthly Maintenance 8
6.4 Six-monthly Maintenance 8
6.5 Oils for Lubricating Coolant 8
6.6 Oil Disposal 8
6.7 Coolant System 8
6.8 The Gearbox 9
6.9 Special Maintenance 9

Chapter 7
TECHNICAL CHARACTERISTICS
7.1 Table of Cutting Capacity and Technical Details 9

Chapter 8
MATERIAL CLASSIFICATION AND CHOICE OF TOOL
8.1 Definition of Materials 10
8.2 Selecting Blade 10
8.3 Teeth Pitch 10
8.4 Cutting and Advance Speed 10
8.5 Blade Running-in 10
8.6 Blade Structure 10
8.7 Blade Type 10

Chapter 9
NOISE TESTS 11

Chapter 10
WIRING DIAGRAM 12

Chapter 11
TROUBLESHOOTING
11.1 - Electrical Components Diagnosis 14
11.2 - Blade and Cut Diagnosis 16

Chapter 12
MACHINE COMPONETS
12.1 Parts List 20
12.2 Explosion Drawings 22

1 *ACCIDENT PREVENTION AND SAFETY REGULATION*

This machine has been designed to comply with national and community accident-prevention regulations. Improper use and/or tampering with the safety devices will relieve the manufacturer of all responsibility.

1.1 Advice for the Operator

- Check that the voltage indicated on machine motor is the same as the line voltage.
- Check the efficiency of your electric supply and grounding system; connect the power cable of the machine to the socket and the ground lead (yellow-green in color) to the grounding system.
- When the saw frame is in suspended mode (or raised) the blade must not move.
- Only the blade section used for cutting must be kept unprotected. To adjust the blade guards use on the blade guides.
- It is forbidden to use the machine without its shields
- Always disconnect the machine from the power socket before blade change or carrying out any maintenance job, even in the case of abnormal machine operation.
- Always wear suitable eyes protection.
- Never put your hands or arms into the cutting area while the machine is operating.
- Do not shift the machine while it is cutting.
- Do not wear loose clothing like: shirts with sleeves that are too long, gloves that are too big, bracelets, chains or any other object that could get caught in the machine during operation. Tie back long hair.
- Keep the area free of equipment, tools, or any other object.
- Perform only one operation at a time. Never have several objects in your hands at the same time. Keep your hands as clean as possible.
- All internal operations, maintenance or repairs, must be performed in a well-lit area or where there is sufficient light from extra sources so as to avoid the risk of even slight accidents

1.2 The electrical equipment according to European Standard" CENELEC EN 60 204-1" which assimilates, with some integrating modifications, the publication "IEC 204-1 (1992)"

- The electrical equipment ensures protection against electric shock as a result of direct or indirect contact. The active parts of this equipment are housed in a box to which access is limited by screws that can only be removed with a special tool; the parts are fed with alternating current as low voltage (24V). The equipment is protected against splashes of water and dust.
- Protection of the system against short circuits is ensured by means of rapid fuses and grounding; in the event of a motor overload, protection is provided by a thermal probe.
- In the event of a power cut, the specific start-up button must be reset.
- The machine has been tested in conformity with point 20 of EN 60204

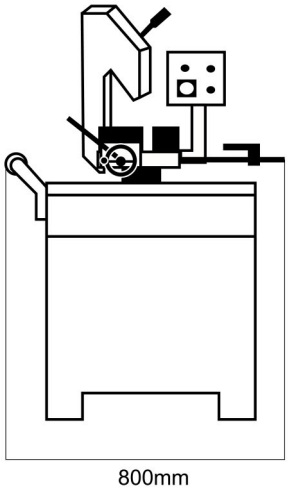
1.3 Emergencies according to European Standard "CENELEC EN 60 204-1 (1992)"

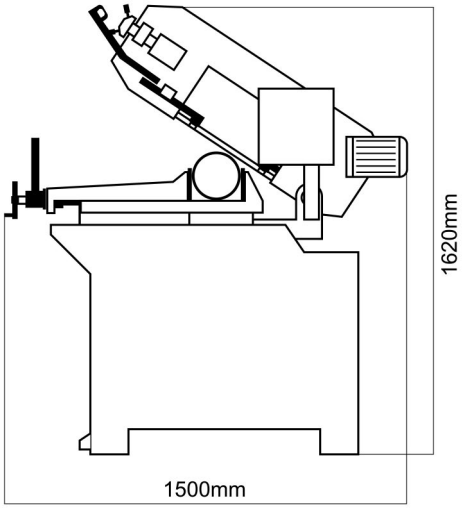
- In the event of incorrect operation or of danger conditions, the machine may be stopped immediately by pressing the red mushroom button.
- The casual or voluntary removal of the protection shield of the flywheels causes the stepping-in of a micro-switch that automatically stops all machine functions.

NOTE: Resetting of machine operation after each emergency stop requires specific restart button.

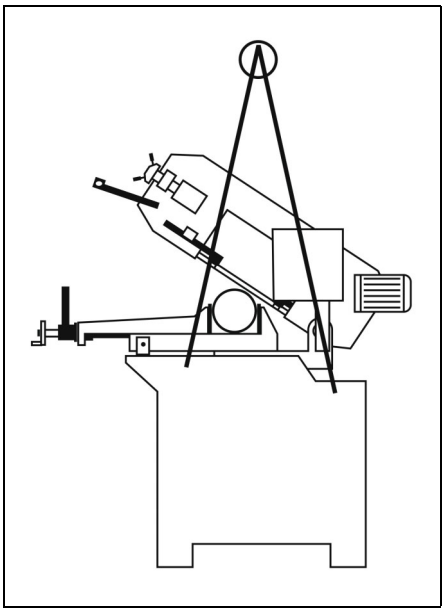
2 *MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING*

2.1 Machine Dimensions





2.2 Transportation of Your Machine

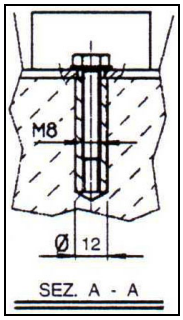


To move the machine, the machine needs to be moved in its own packing, use a forklift truck or sling it with straps as illustrated in the drawing above.

2.3 Minimum Requirements for Housing the Machine

- Main voltage and frequency must comply with the machine's motor requirements.
- Environment temperature should fall within –10 ºC to +50 ºC.
- Relative humidity cannot be over 90%.

2.4 Anchoring the Machine



Position the machine on a firm cement floor, maintaining, at the rear, a minimum distance of 800 mm from the wall; anchor it to the ground as shown in the diagram, using screws and expansion plugs or tie rods sunk In cement, ensuring that it is sitting level.

2.5 Instructions for Assembly of the Loose Parts and Accessories

Fit the components supplied:
Detail 1 Mount bar-stop rod
Detail 2 Mount and align the roll-supporting arm as per the vise table.

2.6 Deactivation of Machine

- If the sawing machine is to be out of use for a long period, it is advisable to proceed as follows:

I) Detach the plug from the electric supply panel
2) Loosen blade
3) Release the saw bow's counter-balance spring
4) Empty the coolant tank
5) Carefully clean and grease the machine
6) If necessary, cover the machine.

2.7 Dismantling (due to deterioration and/or obsolescence)

General rules

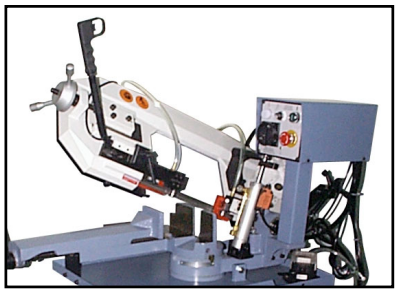
If the machine is to be permanently demolished and/or scrapped, divide the material to be disposed of according to type and composition, as follows:
1) Non-composite cast iron or ferrous materials are recyclable raw materials, so they may be taken to an iron foundry for re-smelting after having removed the contents (classified in point 3).
2) Electrical components, including the cable and electronic material (magnetic cards, etc.), fall within the category of material classified as being assimilated to urban waste according to the laws of your local, state, or federal government, so they may be set aside for collection by the public waste disposal service;
3) Old mineral and synthetic and/or mixed oils, emulsified oils and greases are considered hazardous or special refuse, so they must be collected, transported and disposed of at a special waste disposal service.

NOTE: The standards and legislation concerning refuse is in a constant state of evolution, therefore is subject to changes. The user must keep informed of the regulations at the time of disposal as these may differ from those described above.

3 *THE MACHINE'S FUNCTIONAL PARTS*

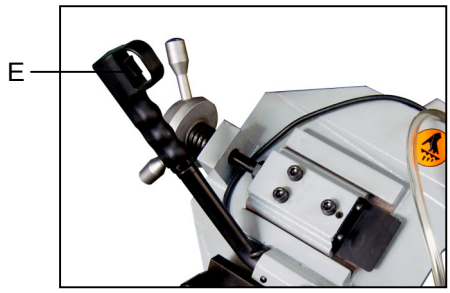
3.1 The Saw Bow

The saw bow is a collection of machine parts consisting of a saw bow, drive members (gears transfer, motor, blade wheel), blade tension system, blade guides, and blade guards. The WE-210SH model also includes a hydraulic cylinder and adjustable counter-balance spring.

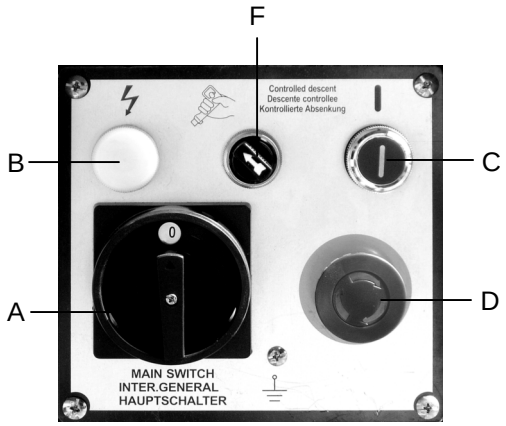


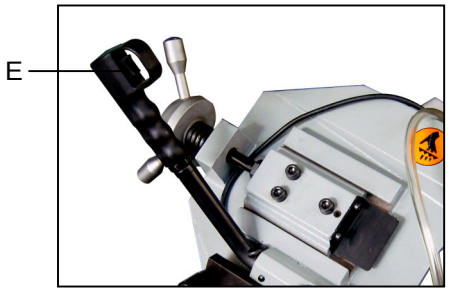
3.2 Controls

For model WE-210S



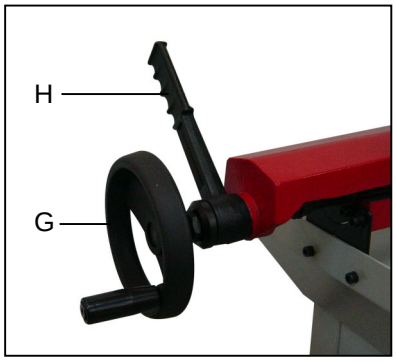
For model WE-210SH





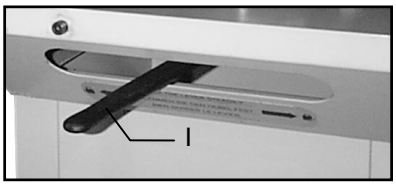
A. Main Connect Switch
B. Power Indicator Light
C. Start Push Button
C1. Operating Indicator Light
D. Emergency Push Button
E. ON/OFF Trigger and Control Handle
F. Manual/Hydraulic Selector

3.3 Vise Adjustment



Clamping the Work Piece
- Place the work piece between the vise jaws and have it rest next to the fixed vise jaw.
- Rotate the hand wheel (G) clockwise to close the free vise jaw on to the work piece, and tighten.
- Rotate the hand wheel (G) counter-clockwise to release.
- Lever (H) can be used to rapidly lock and release the work piece by allowing a shallow gap between the vise and work piece. Then rotate lever (H) counter-clockwise to lock and clockwise to release.

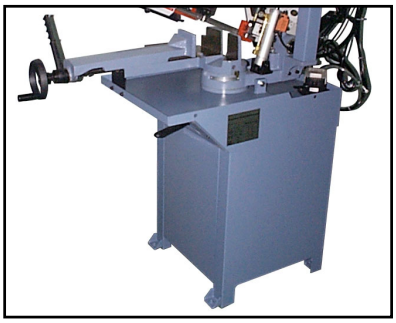
3.4 Cutting Angle Adjustment



Cutting at angles
- Angle can be cut up to 60°.
- Unlock lever (I) by pushing it to the left side.
- Rotate the saw bow to the desired angle by following the index on the scale.
- Lock lever (I) by pushing to the right side.

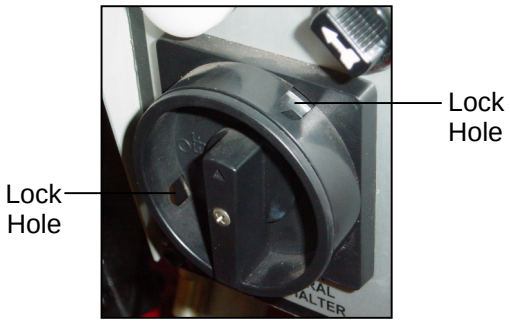
3.5 The Base

The base is a structure supporting the saw bow, the vise, the bar stop, the work piece supporter, pump, swing arm, and the coolant return plate for the support of the material. The base houses the cooling liquid tank.



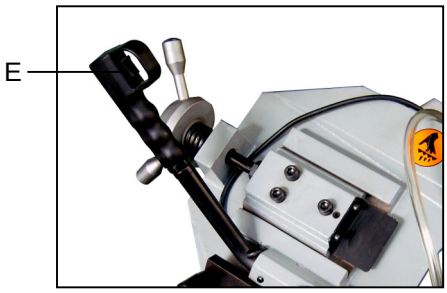
4 OPERATING AND ADVICE ON USING YOUR BANDSAW

4.1 The Operation Cycle
Before operating the machine, all the main parts of the machine must be set to the optimum conditions.



The main connect switch is designed with a lock hole. A lock can be used in the lock hole to prevent operation of the machine for safety or security.

WE-210S Operation Procedure:

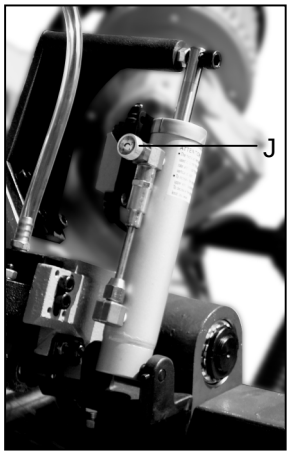


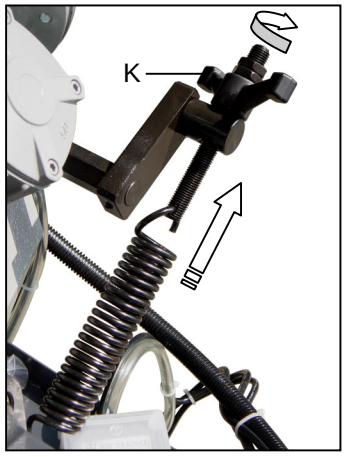
- Raise the saw arm to the highest position.
- Load work piece and clamp it properly.
- Turn on main connect switch (A) to the ON position. Check to see that the indicator light (B) is lit.
- Press the trigger start switch (E) and indicator light (C1) will light. The coolant system should activate at the same time.
- Pull the manual operation handle (E) down to start cutting.
- After the cut is completed, release the trigger start switch (E) the machine will shut down. Manually raise the saw arm to the highest position for the next cut.

If an emergency situation should occur.
- Press the emergency push button (D) down to shut off all functions. To release the emergency pushbutton rotate the mushroom shaped button in the clock-wise direction. The button will pop up, then the cutting cycle can be restarted.

WE-210SH Operation Procedure:
The WE-210SH is equipped with a hydraulic braking system and a bow weight adjusting system. This allows the machine to cut both manually and semi-automatically.

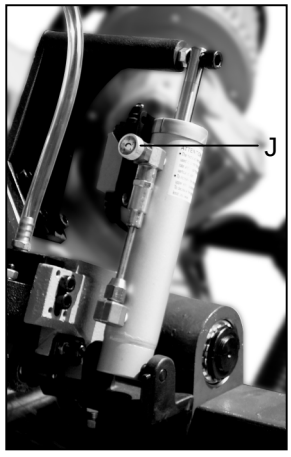
A. Manual Operation

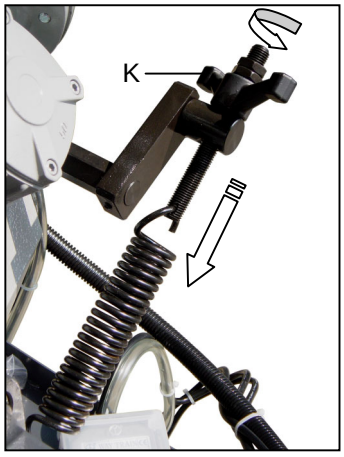




- Check that the hydraulic flow control knob (J) is fully closed.
- Reduce the bow weight. Rotate the wing nut (K) clockwise to increase the tension on the spring.
- Load work piece and clamp it properly.
- Turn on main connect switch (A) to the ON position. Check to see that the indicator light (B) is lit.
- Select manual control mode. Turn the control switch (F) to manual control mode for trigger operation.
- Hold the control handle of the saw bow.
- Fully open the flow control knob (J) by rotating counter-clockwise to the maximum.
- Squeeze the trigger on the control handle to start the blade and lower saw bow to begin cutting.
- When the saw bow reaches the bottom the micro-switch will activate and the blade will stop.
- Keep hold of the control handle to control the return to the start position.
- Turn the flow control knob (J) clockwise to close.
- The cutting operation is complete. Reset the workpiece to continue the next cutting cycle.

B. Semi-auto Cutting Operation





!WARNING!
Failure to fully close the hydraulic flow control knob (J) can result in serious injury. The saw bow may drop suddenly when changing the spring tension.

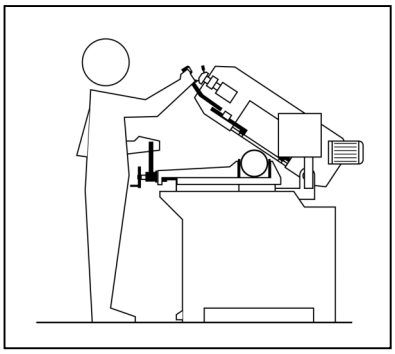
- Check that the hydraulic flow control knob (J) is fully close.

- Increase the bow weight. Rotate the wing nut (K) counter clockwise to reduce the spring tension.
- Load work piece and clamp it properly.
- Turn main connect switch (A) to the ON position. Check to see that the indicator light (B) is lit.
- Select Hydraulic mode on control switch (F).
- Press the start button (C). The coolant system should activate at the same time.
- Slightly turn the hydraulic flow control knob (J) counter-clockwise from 2-3 to control the saw bow's descent rate.
- When the saw bow reaches the bottom the micro-switch will activate and the blade will stop.
- Lift the saw bow to the appropriate height close the hydraulic flow control knob (J) by rotating it clockwise all the way to the end.
- The machine is now ready for the next cutting operation.

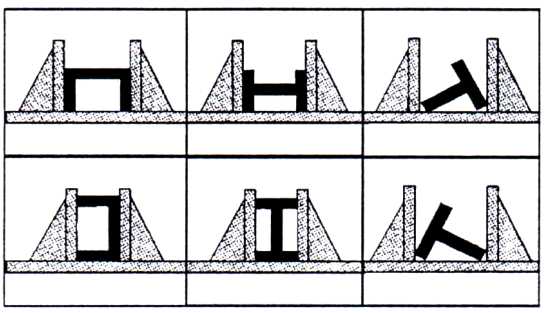
If an emergency situation should occur:
- Press the emergency push button (D) down to shut off all functions. To release the emergency push button rotate the mushroom shaped button (D) clock-wise. The button will pop up, then the cutting cycle can be restarted.

4.2 Recommendations for Using the Machine

The machine has been designed to cut metal building materials, with different shapes and profiles, used in workshops, turner's shops and general mechanical structural work.
Only one operator is needed to use the machine, that must stand as shown in the picture.



- Before starting each cutting operation, ensure that the part is firmly clamped in the vise and that the end is suitably supported.
- These figures below show examples of suitable clamping of different section bars, bearing in mind the cutting capacities of the machine in order to achieve a good efficiency and blade durability.

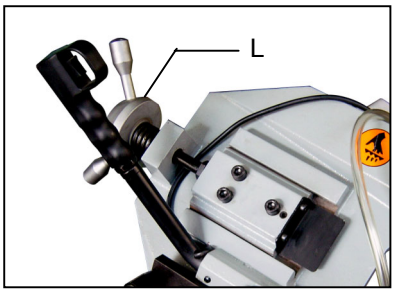


- Do not use blades of a different size from those stated in the machine specifications.
- If the blade gets stuck in the cut, release the running but ton immediately, switch off the machine, open the vise slowly, remove the part and check that the blade or its teeth are not broken. If they are broken, change the tool.
- Before performing any repairs on the machine, consult the dealer.

5 ADJUSTING YOUR MACHINE

5.1 Blade Tension Assembly

Blade tension is important to the proper operation of the saw. Proper blade tension is 700 to 900 kg/mm^2 as measured on a blade tension gauge.



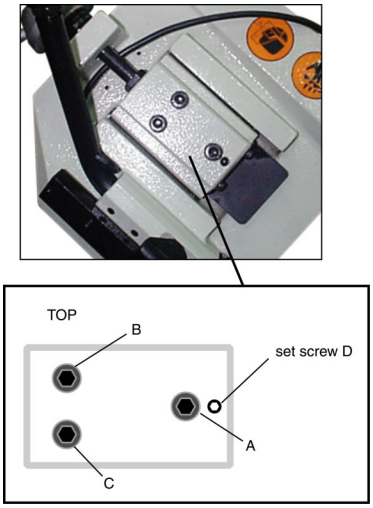
To set the blade tension without the use of a tension gauge:

- Disconnect the machine from the power source.
- Install blade between wheel and insert blade between bearings on blade guides.
- Tension blade slightly to remove any sag in blade between blade wheels.
- Turn blade tension knob (L) one and three quarter to two revolutions clockwise. To test press the flat side of the blade with your thumb, if moves with 2mm-3mm range then it is set correctly.
- After blade has been completely installed, close covers, connect the power source, and run saw for two to three minutes so blade can seat properly.
- Disconnect machine from the power source. Open cover and loosen blade just until it begins to sag.
- Tighten blade until it becomes straight between blade wheel and all sag has been eliminated.
- Tighten blade by turning blade tension wheel two full revolutions. Blade is now property tensioned and ready for use.

Close covers and connect machine to the power source.

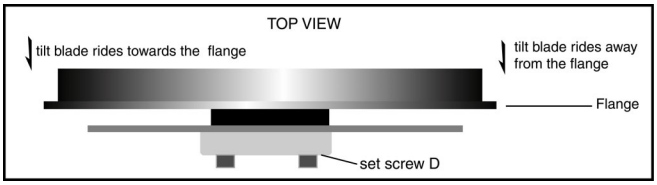
5.2 Aligning the Flywheel

The flywheel's alignment may need adjustment to allow the saw blade to track correctly. Poor flywheel alignment can cause damage to the saw blade or to allow the blade to ride off the blade wheels.



- Raise the saw bow to a usable work height.
- Disconnect the power supply.
- Loosen the Hex nut screws A, B, and C.
- Use and Allen wrench on setscrew D to adjust the tilt of the flywheel.

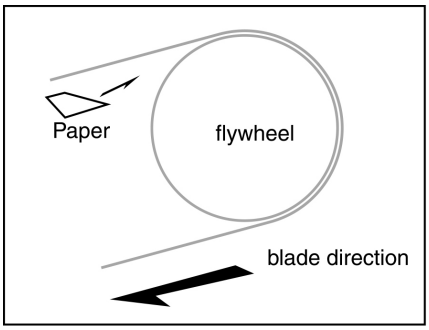
- Turning the setscrew, D clockwise will tilt flywheel so that the blade will ride closer to the flange.
- Turning the setscrew, D counter-clockwise will tilt the flywheel so that the blade will ride away from the flange. If the blade rides too far then it will come off.
  - After the adjustment is finished, fasten the Hex nut screws in this order: A, B, and C.



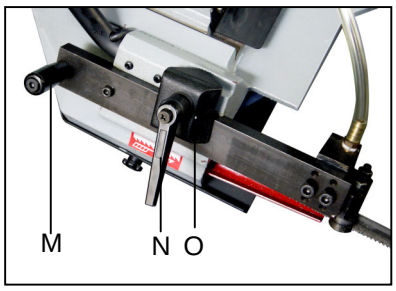
5.3 Checking the Adjustment of the Blade

Use a strip of scrap paper and slide it between the blade and the flywheel while it is running.

- If the paper is cut then the blade is riding too close to the flange. Readjust.
- If the paper folds or creases then the blade is seated properly.
- If you notice that the blade is riding away from the flange, then readjust.



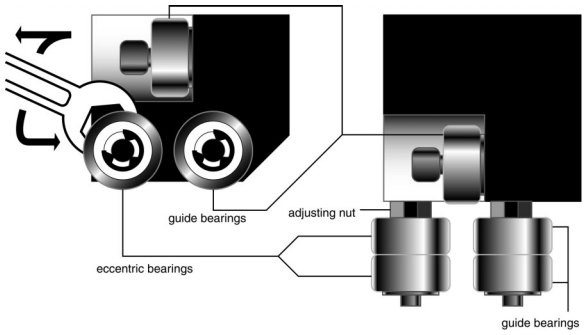
5.4 Adjusting the Blade Guide



- Disconnect the machine from the power source.
- Release the extension bar for the blade guide block. Use the clamping handle (N) to loosen the clamping block (O).
- Hold the revolving handle (M) and slide the blade guide block to be as close as possible to the material without interfering with the cut.
- Tighten the clamping handle (N).
- Reconnect the machine to power source.

Blade Guide Blocks

The blade is guided by means of roller bearings placed during inspection as per the thickness of the blade with a minimum amount of play.

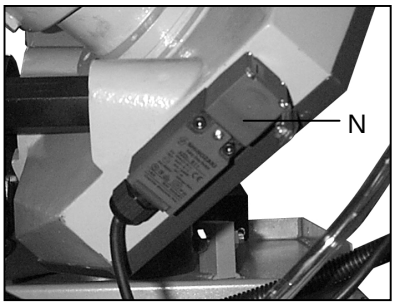


In case the blade needs to be replaced, make sure to always install 0.9mm thick blades for which the blade guide bearing have been adjusted. In the case of toothed blades with different thicknesses adjustment should be carried out as follows:

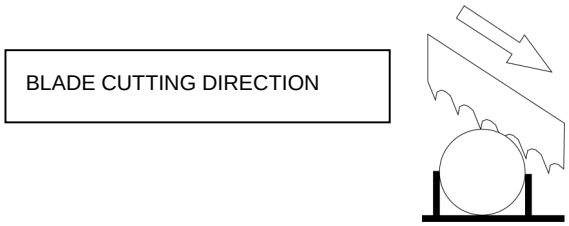
- From the bottom of the guide blocks, use a wrench on the adjusting nut of the eccentric bearing.
- Turning the adjusting nut clockwise will move the eccentric bearing away from the blade.
- Turning the adjusting nut counter-clockwise will move the eccentric bearing closer to the blade.

BEFORE PERFORMING THE FOLLOWING OPERATIONS, THE ELECTRIC POWER SUPPLY AND THE POWER CABLE MUST BE COMPLETELY DISCONNECTED.

5.5 Changing the Blade



To change the blade:
- Lift the saw bow.
- Loosen the blade with the blade tension hand wheel, remove the mobile blade-guard cover, open the flywheel guards and remove the old blade from the flywheels and the blade guide blocks.
- Assemble the new blade by placing it first between the pads and then on the race of the flywheels, paying particular attention to the cutting direction of the teeth.
- Tension the blade and make sure it perfectly fits inside the seat of the flywheels.
- Assemble the mobile blade-guide end, the flywheel guard, and fasten it with the relative knobs. Check the safety micro-switch (N) is activated otherwise when electricity is applied the machine will not start.



WARNING: Always assemble blades having dimensions specified in this manual and for which the blade guide heads have been set; otherwise, see chapter on "Description of the operating cycle" in the section Starting-up.

6 ROUTINE AND SPECIAL MAINTENANCE

THE MAINTENANCE JOBS ARE LISTED BELOW, DIVIDED INTO DAILY, WEEKLY, MONTHLY AND SIX-MONTHLY INTERVALS. IF THE FOLLOWING OPERATIONS ARE NEGLECTED, THE RESULT WILL BE PREMATURE WEAR OF THE MACHINE AND POOR PERFORMANCE.

6.1 Daily maintenance
- General cleaning of the machine to remove accumulated shavings.
- Clean the lubricating coolant drain hole to avoid excess fluid.
- Top off the level of lubricating coolant.
- Check blade for wear.
- Rise of saw frame to top position and partial slackening of the blade to avoid useless yield stress.
- Check functionality of the shields and emergency stops.

6.2 Weekly Maintenance
- Thorough cleaning of the machine to remove shavings, especially from the lubricant fluid tank.
- Removal of pump from its housing, cleaning of the suction filter and suction zone.
- Clean the filter of the pump suction head and the suction area.
- Use compressed air to clean the blade guides (guide bearings and drain hole of the lubricating cooling).
- Cleaning flywheel housings and blade sliding surfaces on flywheels.

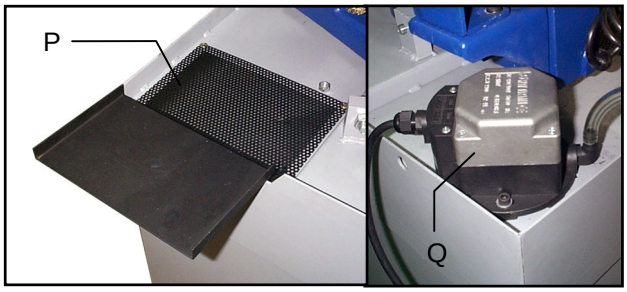
6.3 Monthly Maintenance
- Check the tightening of the motor flywheel screws.
- Check that the blade guide bearings on the heads are perfect running condition.
- Check the tightening of the screws of the gear motor, pump, and accident protection guarding.

6.4 Six-Monthly Maintenance
- Continuity test of the equipotential protection circuit.

6.5 Oils for Lubricating Coolant
Considering the vast range of products on the market, the user can choose the one most suited to their own requirements, using as reference the type SHELL LUTEM OIL ECO. THE MINIMUM PERCENTAGE OF OIL DILUTED IN WATER IS 8 - 10 %.

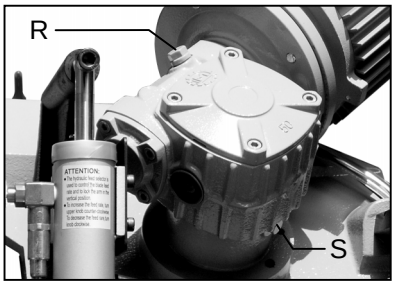
6.6 Oil Disposal
The disposal of these products is controlled by strict regulations. Please see the Chapter on "Machine dimensions Transport - Installation" in the section on *Dismantling.*

6.7 Coolant system



Cleaning the tank
- Use hex wrench to open the plug located on the base below the pump. Allow the coolant to drain-out.
- Remove the grate (P) by loosening the four setscrews.
- Remove the pump (Q) by loosening the four setscrews.
- Use a vacuum cleaner to vacuum chips and debris from the tank.
- Replace the plug.
- Thoroughly clean the pump (Q) and replace.
- Fill the tank with coolant to approximately 25mm below the grate (P).
- Replace the grate (P).

6.8 The Gearbox



The gearbox requires periodic changing of oil. The oil must be changed by the first 6 months of a new machine and every year thereafter.

To change the gear box oil
- Disconnect the machine from the power source.
- Raise the saw bow to vertical position.
- Release the drain hole (S) to draw off gear oil by loosening the oil fill bolt (R).
- Replace the drain plug bolt (S) after oil completely flows off.
- Place the saw bow back to horizontal position.
- Fill Gear box with approximately .3 liter of gear oil through the hole of the oil fill bolt (R).

For reference, use SHELL type gear oil or Mobile gear oil #90.

6.9 Special Maintenance

Special maintenance must be conducted by skilled personnel. We advise contacting your nearest dealer and/or importer. Also the reset of protective and safety equipment and devices (of the reducer), the motor, the motor pump, and other electrical components requires special maintenance.

7 *TECHNICAL CHARACTERISTICS*

7.1 Table of Cutting Capacity and Technical Details

CUTTING CAPACITY			
0°	170	170 x 170	210 x 95
45°	120	110 x 110	
60°	70	60 x 60	

ELECTRIC MOTOR-BLADE ROTATION	kW	0.75
FLYWHEEL DIAMETER	mm	260
BLADE DIMENSIONS	mm	20x0.9x2110
BLADE SPEED CUTTING	m/min	40 / 80
OPENING VICE	mm	215
SAW FRAME TILTING	°	50
WORKING TABLE HEIGHT	mm	890
MACHINE WEIGHT	kg	156

TYPES OF STEEL						CHARACTERISTICS		
USE	I UNI	D DIN	F AF NOR	GB SB	USA AISI-SAE	Hardness BRINELL HB	Hardness ROCKWELL HRB	R=N/mm²
Construction steels	Fe360 Fe430 Fe510	St37 St44 St52	E24 E28 E36	---- 43 50	---- ---- ----	116 148 180	67 80 88	360÷480 430÷560 510÷660
Carbon steels	C20 C40 C50 C60	CK20 CK40 CK50 CK60	XC20 XC42H1 ---- XC55	060 A 20 060 A 40 ---- 060 A 62	1020 1040 1050 1060	198 198 202 202	93 93 94 94	540÷690 700÷840 760÷900 830÷980
Spring steels	50CrV4 60SiCr8	50CrV4 60SiCr7	50CV4 ----	735 A 50 ----	6150 9262	207 224	95 98	1140÷1330 1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4 39NiCrMo4 41CrAlMo7	34CrMo4 36CrNiMo4 41CrAlMo7	35CD4 39NCD4 40CADG12	708 A 37 ---- 905 M 39	4135 9840 ----	220 228 232	98 99 100	780÷930 880÷1080 930÷1130
Alloyed casehardening steels	18NiCrMo7 20NiCrMo2	---- 21NiCrMo2	20NCD7 20NCD2	En 325 805 H 20	4320 4315	232 224	100 98	760÷1030 690÷980
Alloyed for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU C100KU X210Cr13KU 58SiMo8KU	56NiCrMoV7C100K C100W1 X210Cr12 ----	---- ---- Z200C12 Y60SC7	---- BS 1 BD2-BD3 ----	---- S-1 D6-D3 S5	244 212 252 244	102 96 103 102	800÷1030 710÷980 820÷1060 800÷1030
Stainless steels	X12Cr13 X5CrNi1810 X8CrNi1910 X8CrNiMo1713	4001 4301 ---- 4401	---- Z5CN18.09 ---- Z6CDN17.12	---- 304 C 12 ---- 316 S 16	410 304 ---- 316	202 202 202 202	94 94 94 94	670÷885 590÷685 540÷685 490÷685
Copper alloys Special brass Bronze	Aluminium copper alloy G-CuAl11Fe4Ni4 UNI 5275 Special manganese/silicon brass G-CuZn36Si1Pb1 UNI5038 Manganese bronze SAE43 - SAE430 Phosphor bronze G-CuSn12 UNI 7013/2a					220 140 120 100	98 77 69 56,5	620÷685 375÷440 320÷410 265÷314
Cast iron	Gray pig iron G25 Spheroidal graphite cast iron GS600 Malleable cast iron W40-05					212 232 222	96 100 98	245 600 420

8 *MATERIAL CLASSIFICATION AND CHOICE OF TOOL*

Since the aim is to obtain excellent cutting quality, the various parameters such as hardness of the material, shape and thickness, transverse cutting section of the part to be cut, selection of the type of cutting blade, cutting speed and control of saw frame lowering. These specifications must therefore be harmoniously combined in a single operating condition according to practical considerations and common sense, so as to achieve an optimum condition that does not require countless operations to prepare the machine when there are many variations in the job to be performed. The various problems that crop up from time to time will be solved more easily if the operator has a good knowledge of these specifications.

8.1 Definition of materials

The table above lists the characteristics of the materials to be cut. So that the correct tools to use, can be chosen.

8.2 Selecting blade

First of all the pitch of the teeth must be chosen, in other words, the number of teeth per inch (25,4 mm) suitable for the material to be cut, according to these criteria:

- Parts with a thin and/or variable section such as profiles, pipes and plate, need close toothing, so that the number of teeth used simultaneously in cutting is from 3 to 6;
- Parts with large transverse sections and solid sections need widely spaced toothing to allow for the greater volume of the shavings and better tooth penetration;
- Parts made of soft material or plastic (light alloys, mild bronze, Teflon, wood, etc.) also require widely spaced toothing;
- Pieces cut in bundles require combo tooth design.

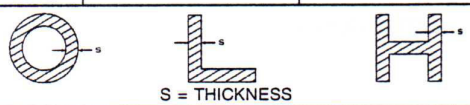
8.3 Teeth pitch

As already stated, this depends on the following factors:

- Hardness of the material
- Dimensions of the section
- Wall thickness.

BLADE TEETH SELECTION TABLE

THICKNESS MM	Z CONTINUOUS TOOTH DESIGN	Z COMBO TOOTH DESIGN
TILL 1.5	14	10/14
FROM 1 TO 2	8	8/12
FROM 2 TO 3	6	6/10
FROM 3 TO 5	6	5/8
FROM 4 TO 6	6	4/6
MORE THAN 6	4	4/6



S = THICKNESS

SOLID Ø OR L MM	Z CONTINUOUS TOOTH DESIGN	Z COMBO TOOTH DESIGN
TILL 30	8	5/8
FROM 30 TO 60	6	4/6
FROM 40 TO 80	4	4/6
MORE THAN 90	3	3/4

Ø = DIAMETER L = WIDTH

8.4 Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm^2/min =area traveled by the disk teeth when removing shavings) are limited by the development of heat close to the tips of the teeth.

- The cutting speed is subordinate to the resistance of the material (R = $N/mm^{2)}$, to its hardness (HRC) and to the dimensions of the widest section.
- Too high an advance speed (= lowering of the saw frame) tends to cause the disk to deviate from the ideal cutting path, producing non rectilinear cuts on bath the vertical and the horizontal plane.

The best combination of these two parameters can be seen directly examining the chips.

Long spiral-shaped chips indicate ideal cutting.

Very fine or pulverized chips indicate lack of feed and/or cutting pressure.

Thick and/or blue chips indicate overload of the blade.

8.5 Blade running-in

When cutting for the first time, it is good practice to run in the tool making a series of cuts at a low advance speed (= 30-35 cm^2/min on material of average dimensions with respect to the cutting capacity and solid section of normal steel with R = 410-510 $Nimm^2$). **Generously spraying the cutting area with lubricating coolant.**

8.6 Blade structure

Bi-metal blades are the most commonly used. They consist of a silicon-steel blade backing by a laser welded high speed steel (HHS) cutting edge. The type of stocks are classified in M2, M42, M51 and differ from each other because of their major hardness due to the increasing percentage of Cobalt (Cc) and molybdenum (Mo) contained in the metal alloy

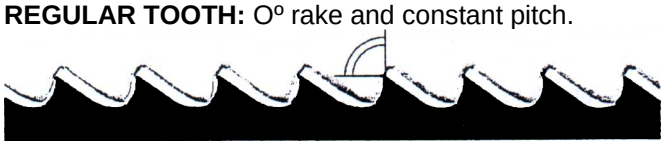
8.7 Blade type

They differ essentially in their constructive characteristics, such as:

- **Shape** and cutting **angle** of tooth
- **Pitch**
- **Set**

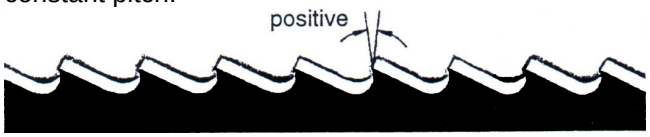
Shape and angle of tooth

REGULAR TOOTH: Oº rake and constant pitch.



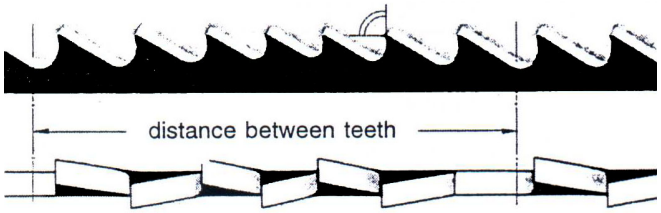
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

POSITIVE RAKE TOOTH: 9º - 10º positive rake and constant pitch.



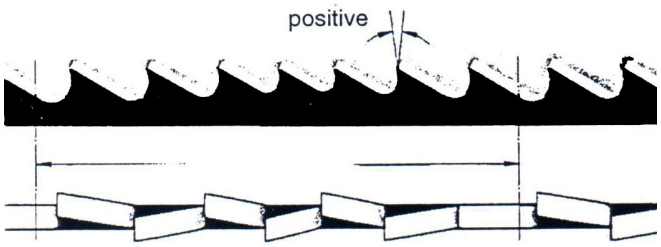
Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

COMBO TOOTH: pitch varies between teeth and consequently varying teeth size and varying gullet depths. Pitch varies between teeth, which ensures a smoother, quieter cut and longer blade life owing to the lack of vibration.



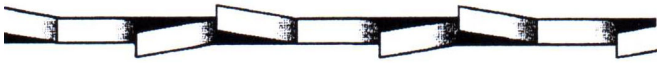
Another advantage offered in the use of this type of blade in the fact that with an only blade it is possible to cut a wide range of different materials in size and type.

COMBO TOOTH: 9º - 10º positive rake.



This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

SETS
Saw teeth bent out of the plane of the saw body, resulting in a wide cut in the workpiece.



REGULAR OR RAKER SET: Cutting teeth right and left, alternated by a straight tooth.

Of general use for materials with dimensions superior to 5 mm. Used for the cutting of steel, castings and hard nonferrous materials.

WAVY SET: Set in smooth waves.

This set is associated with very fine teeth and it is mainly used for the cutting of pipes and thin section bars (from 1 to 3 mm).

ALTERNATE SET (IN GROUPS): Groups of cutting teeth right and left, alternated by a straight tooth.

This set is associated with very fine teeth and it is used for extremely thin materials (less than 1mm).

ALTERNATE SET *(INDIVIDUAL* TEETH): Cutting teeth right and left.

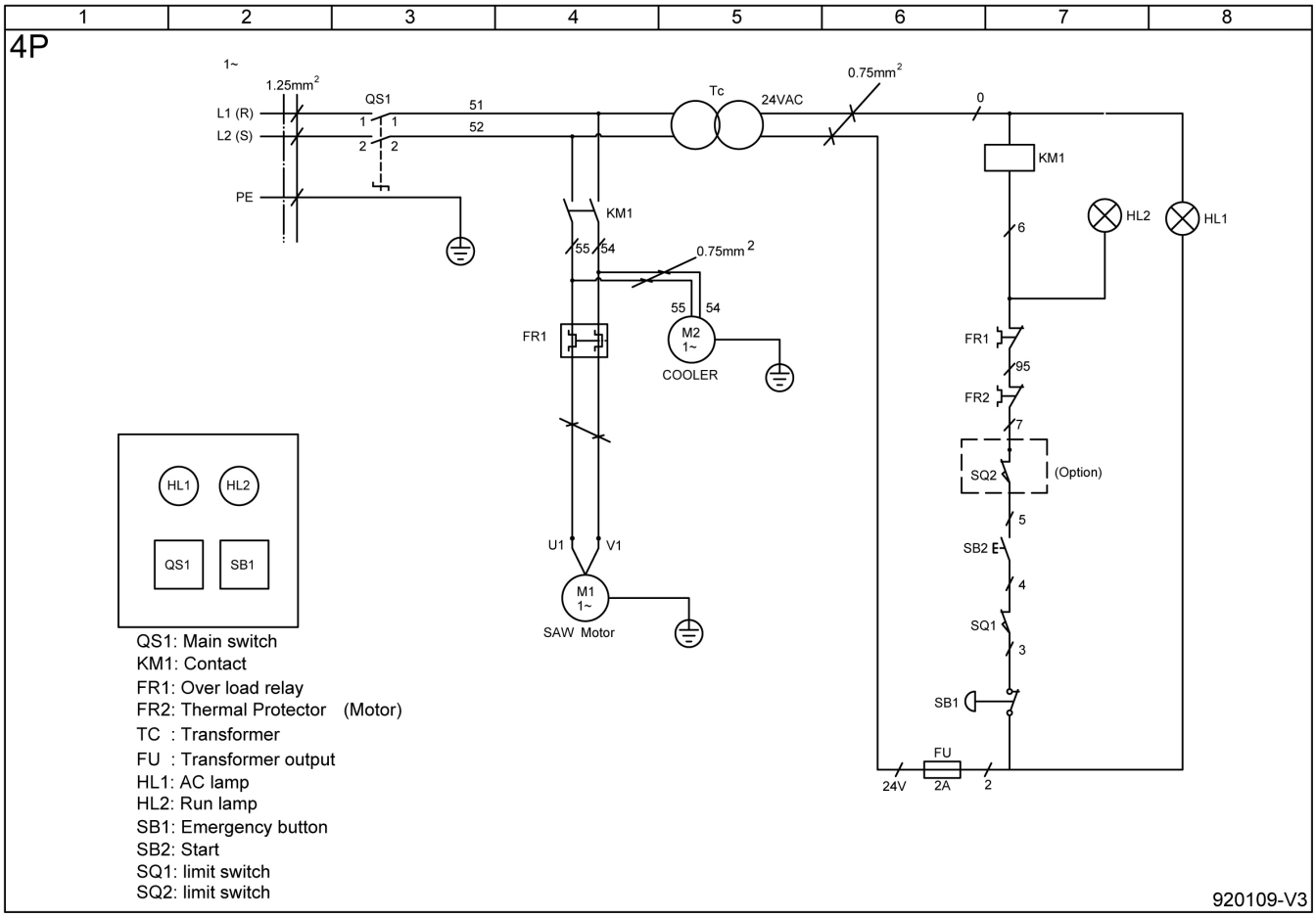
This set is used for the cutting of nonferrous soft materials, plastics and wood.

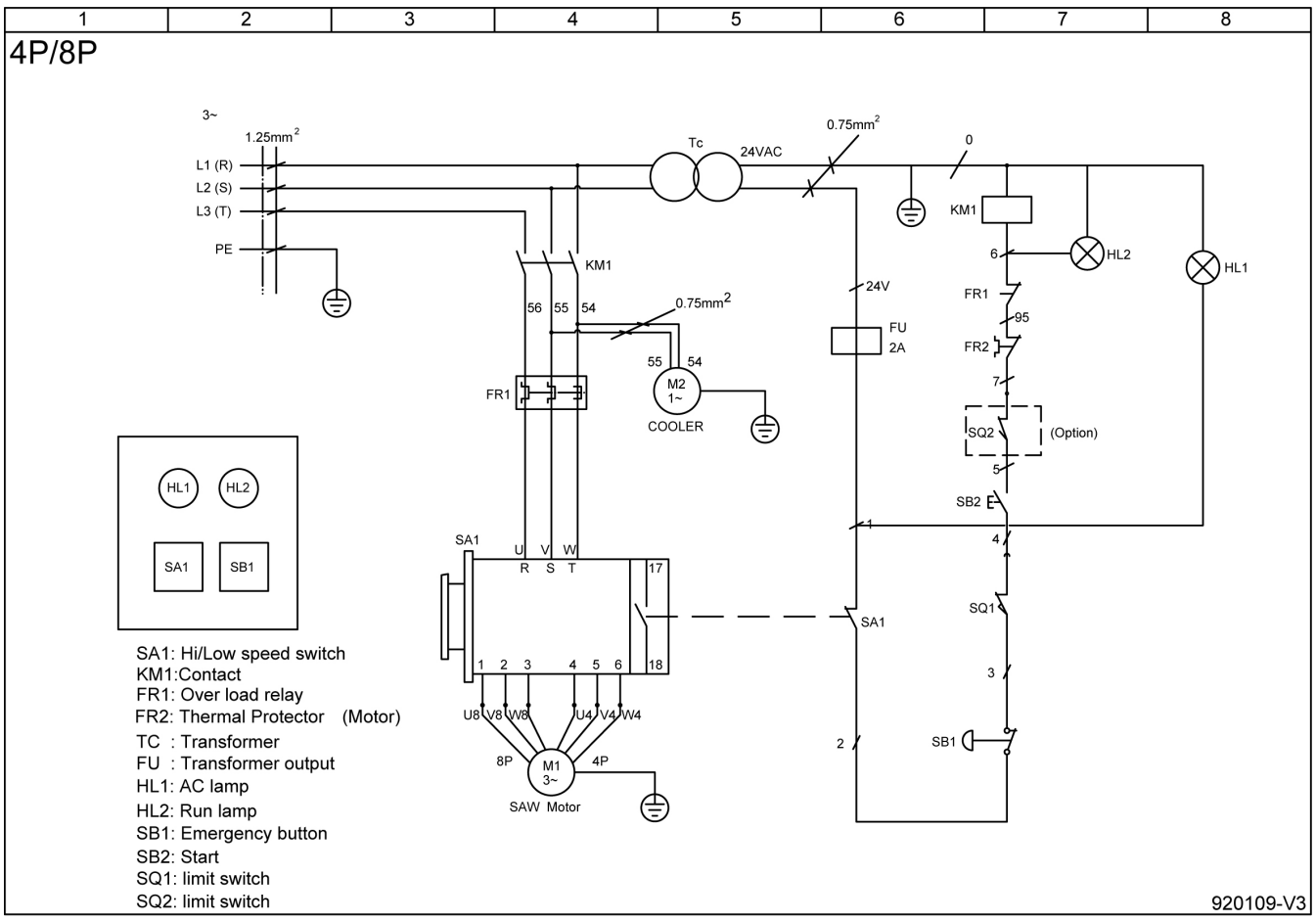
9 NOISE TESTS

The test was held under environmental noise levels of 65db. Noise measurements with the machine operating unload was 71db. Noise level during the cutting of mild carbon steel was 73db.
NOTE: with the machine operating, the noise level will vary according to the different materials being processed. The user must therefore assess the intensity and if necessary provide the operators with the necessary personal protection, as required by Law 277/1991.

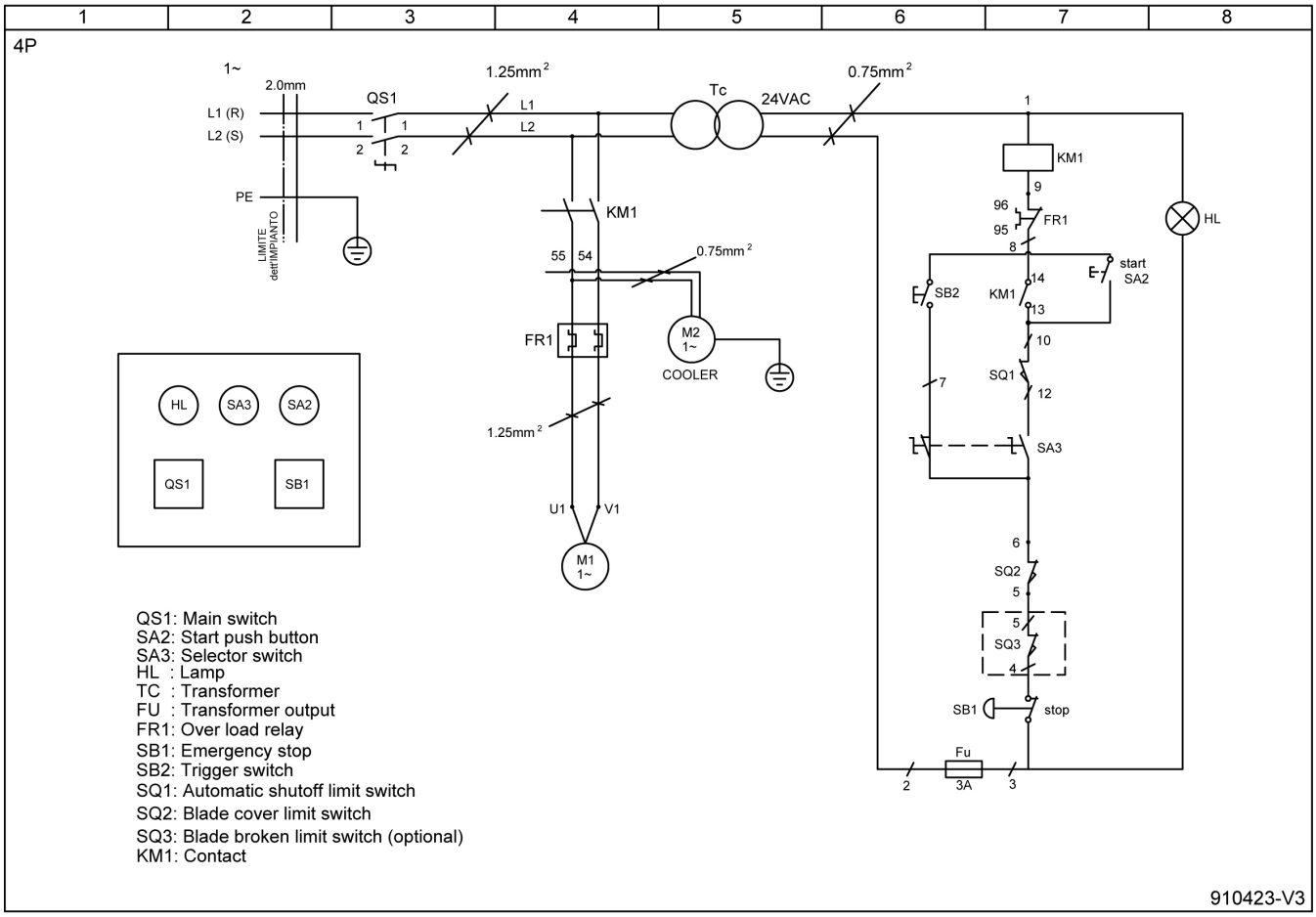
10 *WIRING DIAGRAMS*

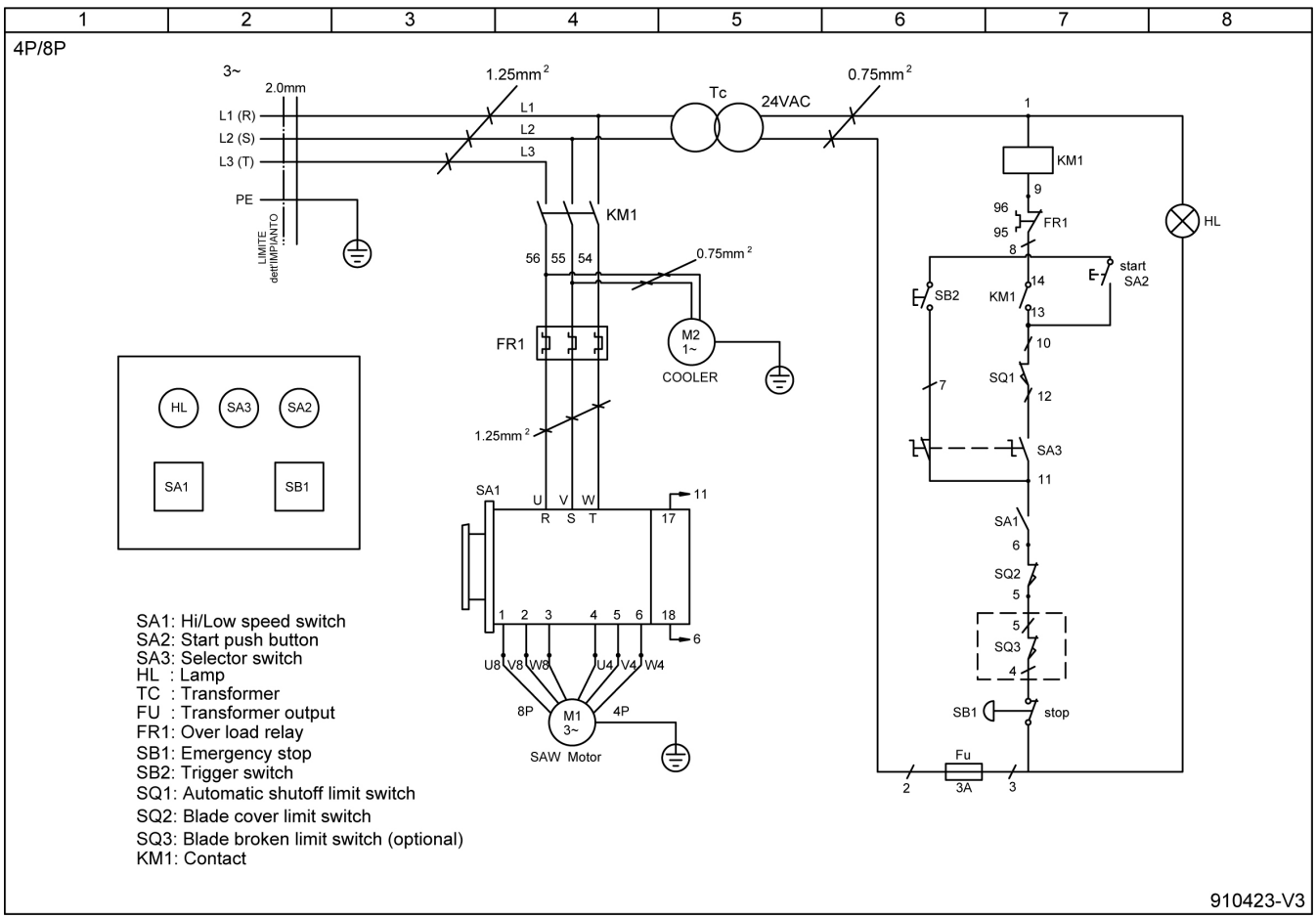
Model WE-210S





Model WE-210SH





11 *TROUBLESHOOTING*

This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.
The first paragraph provides diagnosis for TOOLS and CUTS the second for ELECTRICAL COMPONENTS.

11.1 - Electrical components diagnosis

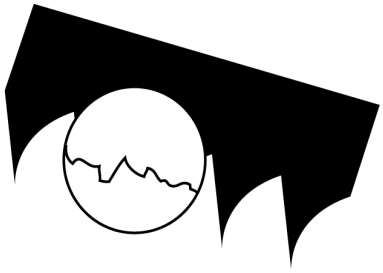
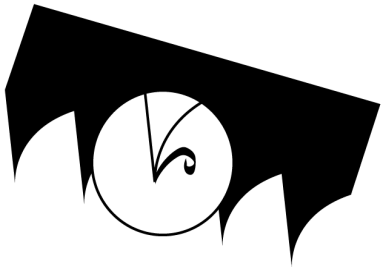
Model WE-210S

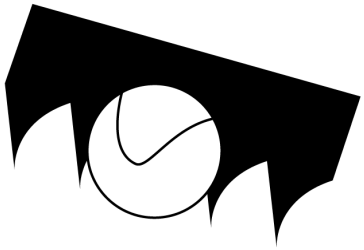
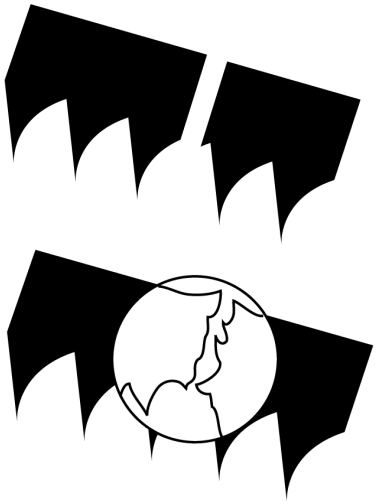
FAULT	PROBABLE CAUSE	REMEDY
THE BAND ROTATION MOTOR DOES NOT WORK	"SA1" speed switch (3 phase only)	It must be exactly turned towards Rabbit or Turtle sign.
	"FR1" band motor over-load relay	Push down FR1 red button. After a motor cooling time of 5 minutes, if there is no current continuity on these two wires, the motor must be replaced.
	"SB1" emergency switch	Reset emergency switch (see operation procedure).
	"SB2" start push button	Check the functioning and/or possible damages. If so, replace it.
	Band motor temperature relay	Check for current continuity on both wires of the probe after a motor cooling time of 10 – 15 minutes. If there is no current continuity on these two wires, the motor must be replaced or rewound.
MACHINE DOES NOT WORK	Fuses "FU"	Check electrical efficiency. If not, replace the fuse.
	"SQ1" blade cover limit switch	Check closing of the fly wheel cover. Check the efficiency of the device; replace it if damaged.
	"SQ2" blade broken limit switch (optional)	Check the efficiency of the device; replace it if damaged.
	Speed switch "SA1" in position "0"	It must be exactly turned to Rabbit or Turtle sign.
	Emergency button "SB1" on	Reset the emergency switch by following the steps of Operation Procedure. Check electrical efficiency, if not, replace it.
	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M1"	Check current continuity on the two wires in the prone, if not, replace the motor.
MOTOR STOPPED WITH PILOT LIGHT "HL2" LIT	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M 1"	Check that it is not burnt and that it turns freely. Replace it if damaged.

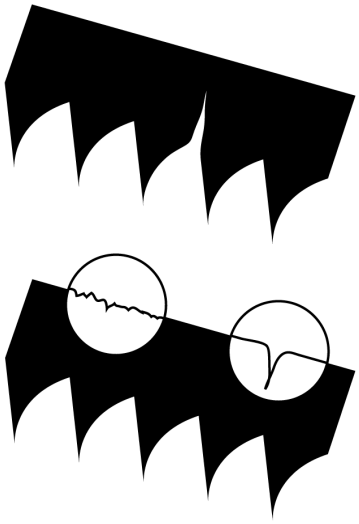
Model WE-210SH

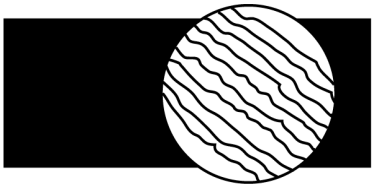
FAULT	PROBABLE CAUSE	REMEDY
THE BAND ROTATION MOTOR DOES NOT WORK	"SA1" two-speed switch (3 phase only)	It must be exactly turned towards Rabbit or Turtle sign.
	"FR1" band motor over-load relay	Push down FR1 red button. After a motor cooling time of 5 minutes, if there is no current continuity on these two wires, the motor must be replaced.
	"SB1" emergency switch	Reset emergency switch (see operation procedure).
	"SA2" start push button	Check the functioning and/or possible damages. If so, replace it.
	Band motor temperature relay	Check for current continuity on both wires of the probe after a motor cooling time of 10 – 15 minutes. If there is no current continuity on these two wires, the motor must be replaced or rewound.
MACHINE DOES NOT WORK	Fuses "FU"	Check electrical efficiency. If not, replace the fuse.
	"SQ1" Automatic shutoff limit switch	Refer to the operation procedure and adjust the switch if machine doesn't shut off after the material completely cuts. Replace it if it damaged.
	"SQ2" blade cover limit switch	Check closing of the fly wheel cover. Check the efficiency of the device; replace it if damaged.
	"SQ3" blade broken limit switch (optional)	Check the efficiency of the device; replace it if damaged.
	Speed switch "SA1" in position "0"	It must be exactly turned to Rabbit or Turtle sign.
	Emergency button "SB1" on	Reset the emergency switch by following the steps of Operation Procedure. Check electrical efficiency, if not, replace it.
	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M1"	Check current continuity on the two wires in the prone, if not, replace the motor.
MOTOR STOPPED WITH PILOT LIGHT "HL2" LIT	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M 1"	Check that it is not burnt and that it turns freely. Replace it if damaged.

11.2 - Blade and cut diagnosis

FAULT	PROBABLE CAUSE	REMEDY
TOOTH BREAKAGE  	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See chapter on "Material classification and blade selection", in the section *Blade selection table according to cutting and feed speed.*
	Wrong tooth pitch	Choose a suitable blade. See Chapter "Material classification and blade selection".
	Chips sticking onto teeth and in the gullets or material that gums	Check for clogging of coolant drain holes on the blade-guide blocks and that flow is plentiful in order to facilitate the removal of chips from the blade.
	Defects on the material or material too hard	Material surfaces can be oxidized or covered with impurities making them, at the beginning of the cut, harder that the blade itself, or have hardened areas or inclusions inside the section due to productive agents used such as casting sand, welding wastes, etc. Avoid cutting these materials or in a situation a cut has to be made use extreme care, cleaning and remove any such impurities as quickly as possible.
	Ineffective gripping of the part in the vise	Check the gripping of the part.
	The blade gets stuck in the material	Reduce feed and exert less cutting pressure.
	Starting cut on sharp or irregular section bars	Pay more attention when you start cutting.
	Poor quality blade	Use a superior quality blade.
	Previously broken tooth left in the cut	Accurately remove all the parts left in.
	Cutting resumed on a groove made previously	Make the cut elsewhere, turning the part.
	Vibrations	Check gripping of the part.
	Wrong tooth pitch or shape	Replace blade with a more suitable one. See "Material classification and blade selection" in the *Blade Types* section. Adjust blade guide pads.
	Insufficient lubricating, refrigerant, or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
	Teeth positioned in the direction opposite the cutting direction	Turn teeth to correct direction.

FAULT	PROBABLE CAUSE	REMEDY
PREMATURE BLADE WEAR 	Faulty running-in of blade	See "Material classification and blade selection" in the *Blade running-in* section.
	Teeth positioned in the direction opposite the cutting direction	Turn teeth in correct direction.
	Poor quality blade	Use a superior quality blade.
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See chapter on "Material classification and blade selection*,"* in the section *Blade selection table according to cutting and feed speed.*
	Defects on the material or material too hard	Material surfaces can be oxidized or covered with impurities making them, at the beginning of the cut, harder that the blade itself, or have hardened areas or inclusions inside the section due to productive agents used such as casting sand, welding wastes, etc. Avoid cutting these materials or perform cutting with extreme care, cleaning and remove such impurities as quickly as possible.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating coolant, checking that the coolant nozzle and pipe are not blocked. Check the emulsion percentage.
BLADE BREAKAGE 	Faulty welding of blade	The welding of the blade is of utmost importance. The meeting surfaces must perfectly match and once they are welded they must have no inclusions or bubbles; the welded part must be perfectly smooth and even. They must be evenly thick and have no bulges that can cause dents or instant breakage when sliding between the blade guide pads.
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade.
	Wrong tooth pitch	See chapter on "Material classification and blade selection", in the section *Blade selection table according to cutting and feed speed.*
	Ineffective gripping of the part in the vice	Choose a suitable blade. See Chapter "Material classification and blade selection."
	Blade touching material at beginning of cut	Check the gripping of the part.
	Remedy	At the beginning of the cutting process, never lower the saw bow before starting the blade motor.

FAULT	PROBABLE CAUSE	REMEDY
	Blade guide pads not regulated or dirty because of lack of maintenance	Check distance between pads (see "Machine adjustments" in the *Blade Guide Blocks* section): extremely accurate guiding may cause cracks and breakage of the tooth. Use extreme care when cleaning.
	Blade guide block too far from material to be cut	Approach head as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Improper position of blade on flywheels	The back of blade rubs against the support due to deformed or poorly welded bands (tapered), causing cracks and swelling of the back contour.
	Insufficient lubricating coolant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
STEAKED OR ETCHED BANDS	Damaged or chipped blade guide pads	Replace them.
	Tight or slackened blade guide bearings.	Adjust them (see Chapter "Machine adjustments" in *Blade guide* section).
CUTS OFF THE STRAIGHT	Blade not parallel as to the counter service	Check fastenings of the blade guide blocks as to the counter-vice so that they are not too loose and adjust blocks vertically; bring into line the position of the degrees and if necessary adjust the stop screws of the degree cuts.
	Blade not perpendicular due to the excessive play between the guide pads and maladjustment of the blocks	Check and vertically re-adjust the blade guide blocks; reset proper side guide play (see Chapter "Machine adjustments" In *Blade guide* section).
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Worn out blade	Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Wrong tooth pitch	Replace it. Blade with major density of teeth is being used, try using one with less teeth (see Chapter "Material classification and blade selection" in the *Blade Types* section).

FAULT	PROBABLE CAUSE	REMEDY
	Broken teeth	Irregular work of the blade due to the lack of teeth can cause deflection in the cut; check blade and if necessary replace it.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating coolant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion *percentage.*
FAULTY CUT	Worn out flywheels Flywheel housing full of chips	The support and guide flange of the band are so worn out that they cannot ensure the alignment of the blade, causing faulty cutting; blade rolling and drawing tracks can have become tapered. Replace them. Clean with compressed air.
STREAKED CUTTING SURFACE 	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Poor quality blade	Use a superior quality blade.
	Worn out blade or with chipped and/or broken teeth	Replace it.
	Wrong tooth pitch	Blade used probably has too large teeth, use one with more teeth (see **"Material classification and blade selection"** in the *Blade Types* section).
	Blade guide block too far from material to be cut	Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Insufficient lubricating coolant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating coolant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
NOISE ON GUIDE BLOCKS	Chipped bearings Worn out or damaged pads	Dirt and/or chips between blade and guide bearings. Replace them. Replace them.

PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
1	Base (Right Part)		1	56	Nut	M20	1
1-1	Base (Left Part)		1	56-1	Set Screw	M5x5	1
2	Hex. Cap Bolt	M12x40	2	57	Bearing Bushing		1
3	Nut	M12	2	58	Ball Bearing	#51104	1
4	Base Cover Plate		2	59	Lock Handle		1
5	Hex. Cap Bolt	M8x16	8	60	Bushing		1
6	Flat Washer	M8x18x2	16	61	Hex. Socket Cap Screw	M6x100x28	2
7	Nut	M8	8	62	Movable Vise		1
8	Flat Washer	M10x21x2	2	63	Compressed Spring		1
9	Spring Washer	M10	2	64	Lead Screw		1
10	Hex. Socket Cap Screw	M10x20	2	64-1	Key	5x5x15	1
11	Hex. Socket Cap Screw	M6x8	2	64-2	Flat Washer	M8	1
12	Plate		1	64-3	Hex. Socket Cap Screw	M8x16	1
13	Hex. Socket Cap Screw	M8x20	2	66	Vise Table		1
14	Spring Washer	M8	2	67	Set Screw	M8x10	1
15	Hex. Socket Cap Screw	M8x20	2	68	Hex. Socket Cap Screw	M5x8	2
15-1	Spring Washer	M8	2	69	Scale Point		1
16	Flat Washer	M8x18x2	2	70	Set Screw	M8x10	1
17	Supporting Plate		1	71	Pivot		1
18	Nut	M8	2	72	Anti-Bust Cover	Ø30	2
18-1	Flat Washer	M8x18x2	2	73	Ball Bearing	#32006	2
19-1	Support Plate		1	74	Nut	M10	2
19-2	Hex. Cap Bolt	M10x20	2	75	Hex. Cap Bolt	M10x40	1
19-3	Spring Washer	M10	2	75-1	Hex. Cap Bolt	M10x25	1
19-4	Flat Washer	M10x21x2	2	76	Spring Hook		1
28	Block Plate		1	77	Star Washer	Ø30	1
31	Hex. Cap Bolt	M12x40	2	78	Nut	M30	1
32	Nut	M12	2	79	Swing Arm		1
33	Filter Net		1	80	Scale		1
34	Round Head Screw	M5x10	4	81	Rivet	2.3x4	2
35	Hex. Socket Cap Screw	M6x25	2	82	Bar-Stop-Rod		1
36	Flat Washer	M6	2	83	Rod		1
37	Hose	5/16"x125cm	1	84	Butterfly Screw	5/16x3/4	1
38	Hose Clamp		1	85	Cover		1
39	Pump		1	86	Hex. Socket Cap Screw	M5x8	4
40	Plug	M3/8"	1	88	Round Head Screw	M5x8	2
41	Coolant and Chip Tray		1	89	Control Box Bottom Plate		1
42	Locking Lever		1	90-1	Transformer		1
43	Set Screw	M10x16	1	90-2	Magnetic Connector		1
44	Spring Washer	M10	1	90-3	Fuse Seat		1
45	Hex. Socket Cap Screw	M10x35	1	90-4	Overload Rely		1
46	Nut		1	90-5	Terminal Connector		1
47	Shaft		1	91	Round Head Screw	M5x8	4
48	Oil Seal	4m/m(51.7-52cm)	1	92-1	Main Connect Switch	3PH	1
50	Disk		1	92-1A	0-1 Power Switch (not shown)	1PH	1
51	Spring Washer	M8	4	92-2	Power Indicator Light		1
52	Hex. Socket Cap Screw	M8x30	4	92-3	Emergency Switch		1
53	Set Screw	M8x10	1	92-4	Operating Indicator Light		1
54	Hand Wheel	5-1/2"	1	93	Control Box Panel		1
55	Set Screw	M8x10	1	93-H	Control Box Panel		1

951021

PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
93-H1	Manual/ Auto Selector		1	145A	Saw Arm		1
93-H2	Start Button		1	145-1	Set Shaft		1
94	Control Box Bottom Part		1	146	Hose	5/16"x75cm	1
94-1	Plug (for WE-210S)	HP-16	1	147	Pipe Fitting	1/4Px5/16	2
95	Support		1	148A	Pipe Fitting Seat		1
96	Setting Bracket		1	150	Coolant Switch	1/4Px5/16	1
97	Spring Washer	M8	2	150-1	Brace		1
98	Hex. Socket Cap Screw	M8x20	2	150-2	Hex. Socket Cap Screw	M6x12	2
99	Spring Washer	M8	4	151	Hose Clamp		1
100	Hex. Socket Cap Screw	M8x20	4	152	Hose	5/16"x35cm	1
101	Hex. Socket Cap Screw	M5x8	4	153	Limit Switch		1
103	Front Ball Bearing Bracket		1	153-1	Switch Pin		1
104	Setting Bracket		1	154	Hex. Socket Cap Screw	M4x35	2
105	Handle	M10x45	1	155	Spring Shaft		1
106	Hex. Socket Cap Screw	M6x8	1	155-H1	Spring Shaft		1
107	Plastic Handle	M6	1	155-H2	Setting Plate		1
108	Spring Washer	M8	3	155-H3	Handle		1
109	Hex. Socket Cap Screw	M8x25	3	155-H4	Nut	M16x2.0x8t	2
110	Set Screw	M8x30	2	155-H5	Bushing		1
114	Rod		1	155-H6	Adjustable Shaft		1
115	Nut	M16x2	1	155-H7	Spring		1
116	Trigger Switch		1	155-H8	Set Screw	M8x10	3
117	Cover Plate		1	156	Spring		1
118	Hex. Socket Cap Screw	M6x8	2	157	Key	7x7x25	1
119	Set Screw	M10x25	1	158	Gear Box		1
120	Hex. Socket Cap Screw	M10x40	3	159	Key	5x5x25	1
121	Spring Washer	M10	3	160	Motor		1
122A	Slide		1	161	Spring Washer	M8	4
123	Nut	M16x2	1	162	Hex. Cap Bolt	M8x25	4
124	Handle		2	163	Set Screw	M6x12	4
125	Handle Wheel		1	170	Set Screw	M6x12	4
126	Thrust Spring Washer		8	172	Hex. Socket Cap Screw	M8x25	2
127	Tension Shaft		1	173	Centric Shaft		2
128A	Shaft		1	174	Ball Bearing	#608ZZ	8
129	Ball Bearing	#6006ZZ	2	175	E Ring	E7	4
130	Idle Flywheel		1	176	Eccentric Shaft		2
131	Washer		1	177	Front Ball Bearing Seat		1
132	Spring Washer	M10	1	178	Front Blade Guard		1
133	Hex. Cap Bolt	M10x25	1	179	Hex. Socket Cap Screw	M6x8	1
134A	Blade		1	180	Hex. Socket Cap Screw	M8x20	2
135	Knob Bolt	M6x10	4	181	Ball Bearing	#608ZZ	2
136A	Blade Cover		1	182	Flat Washer	M8x18x2	2
137	Round Head Screw	M4x8	2	183	Pipe Fitting	1/4Px5/16	2
138-1	Nut	M4	2	184	Nut	M8	4
139	Hex. Cap Bolt	M10x25	1	185	Spring Washer	M8	4
140	Spring Washer	M10	1	186	Rear Ball Bearing Seat		1
141	Washer		1	188	Hex. Socket Cap Screw	M8x25	2
142	Drive Flywheel		1	189	Rear Blade Guard		1
143	Hex. Socket Cap Screw	M8x35	4	190	Round Head Screw	M6x8	2
144	Spring Washer	M8	4				

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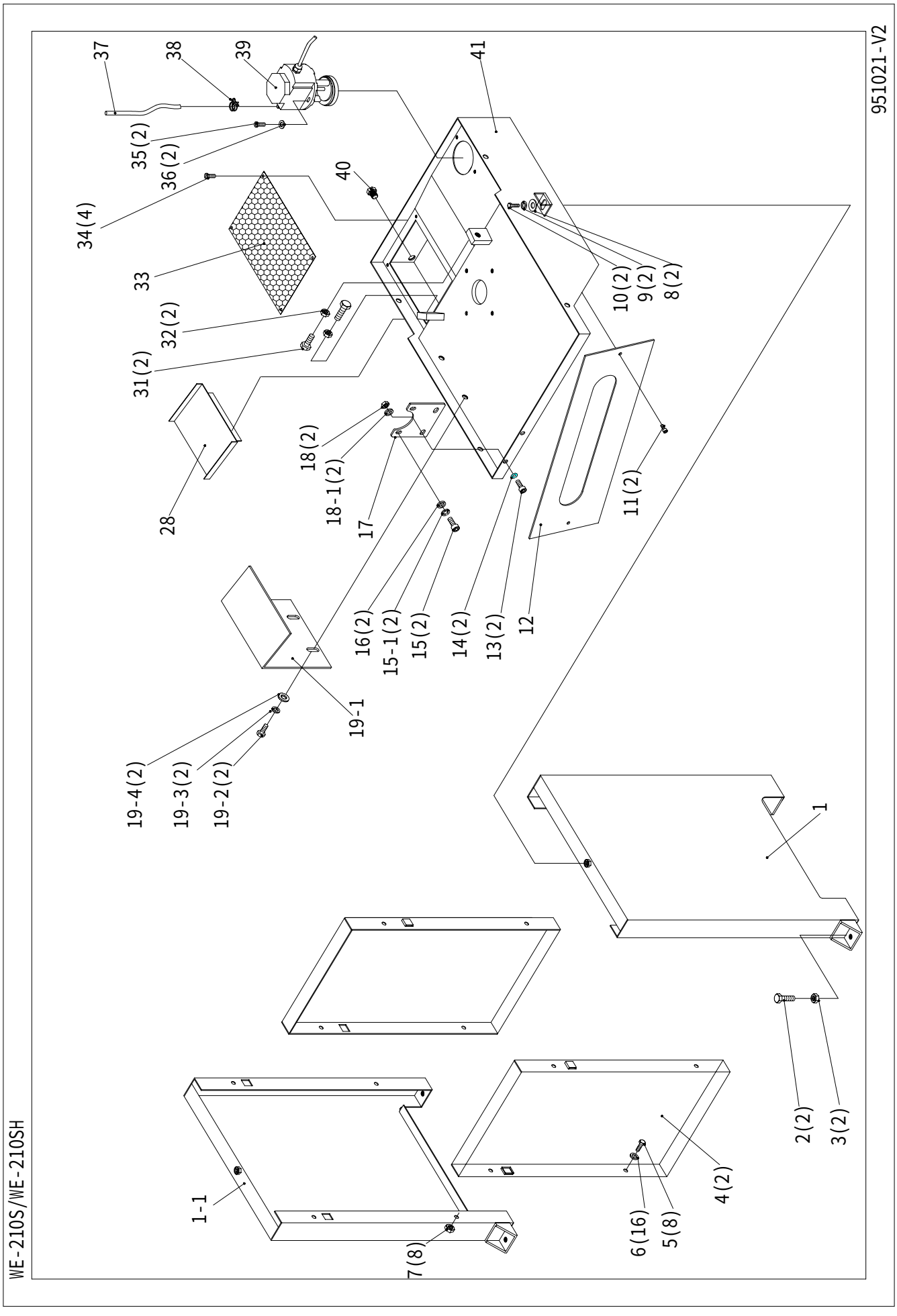
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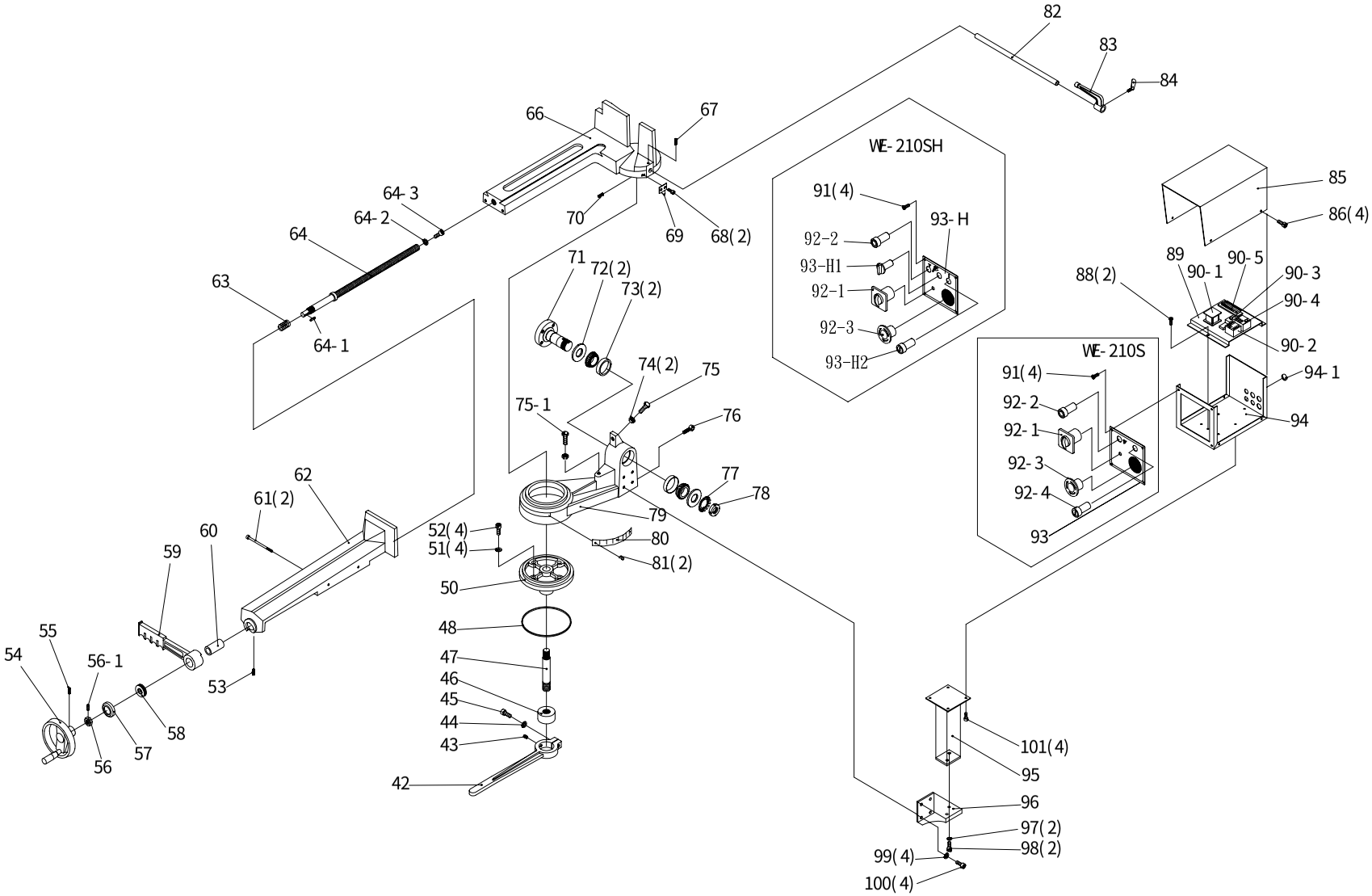

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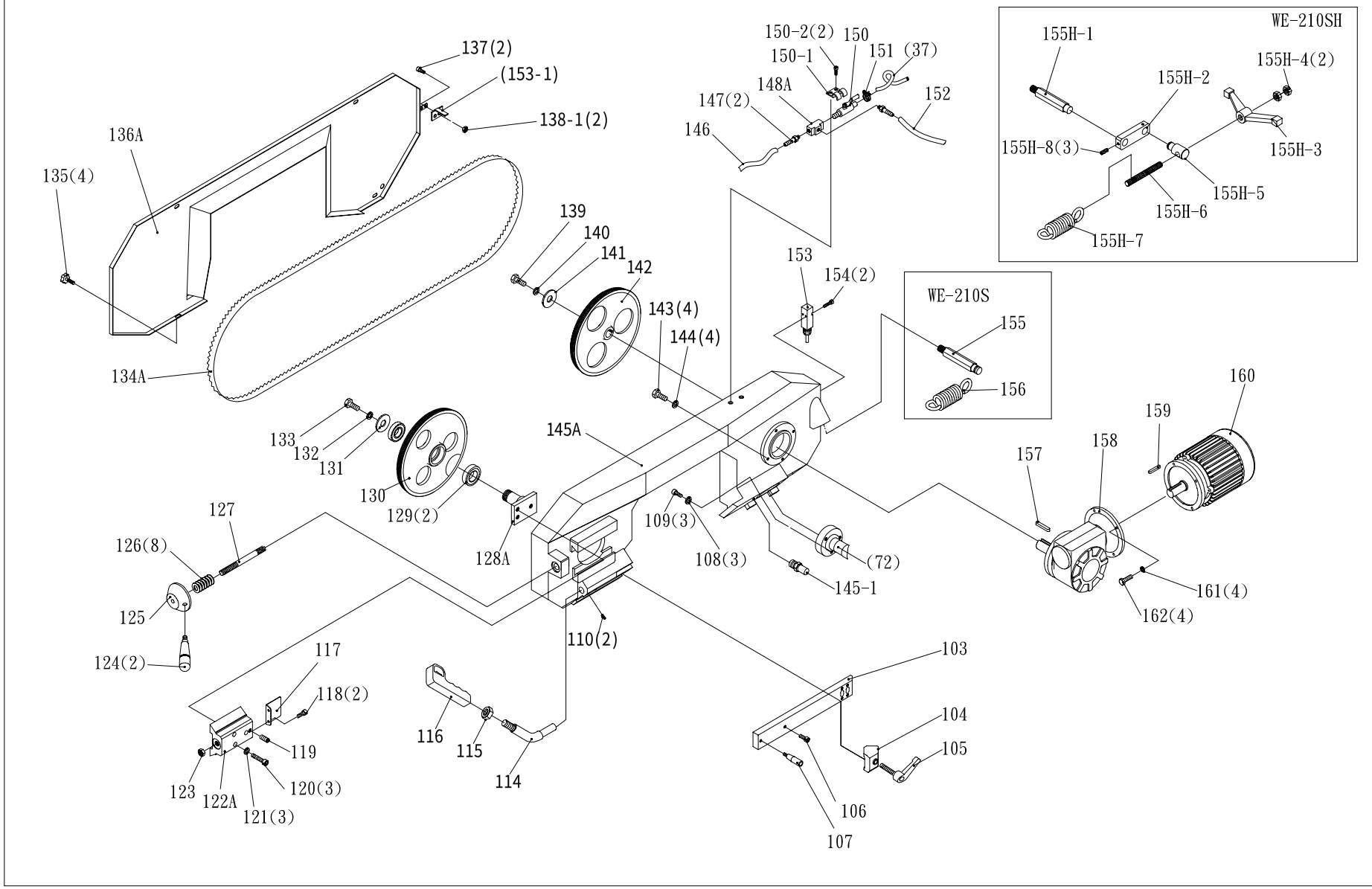
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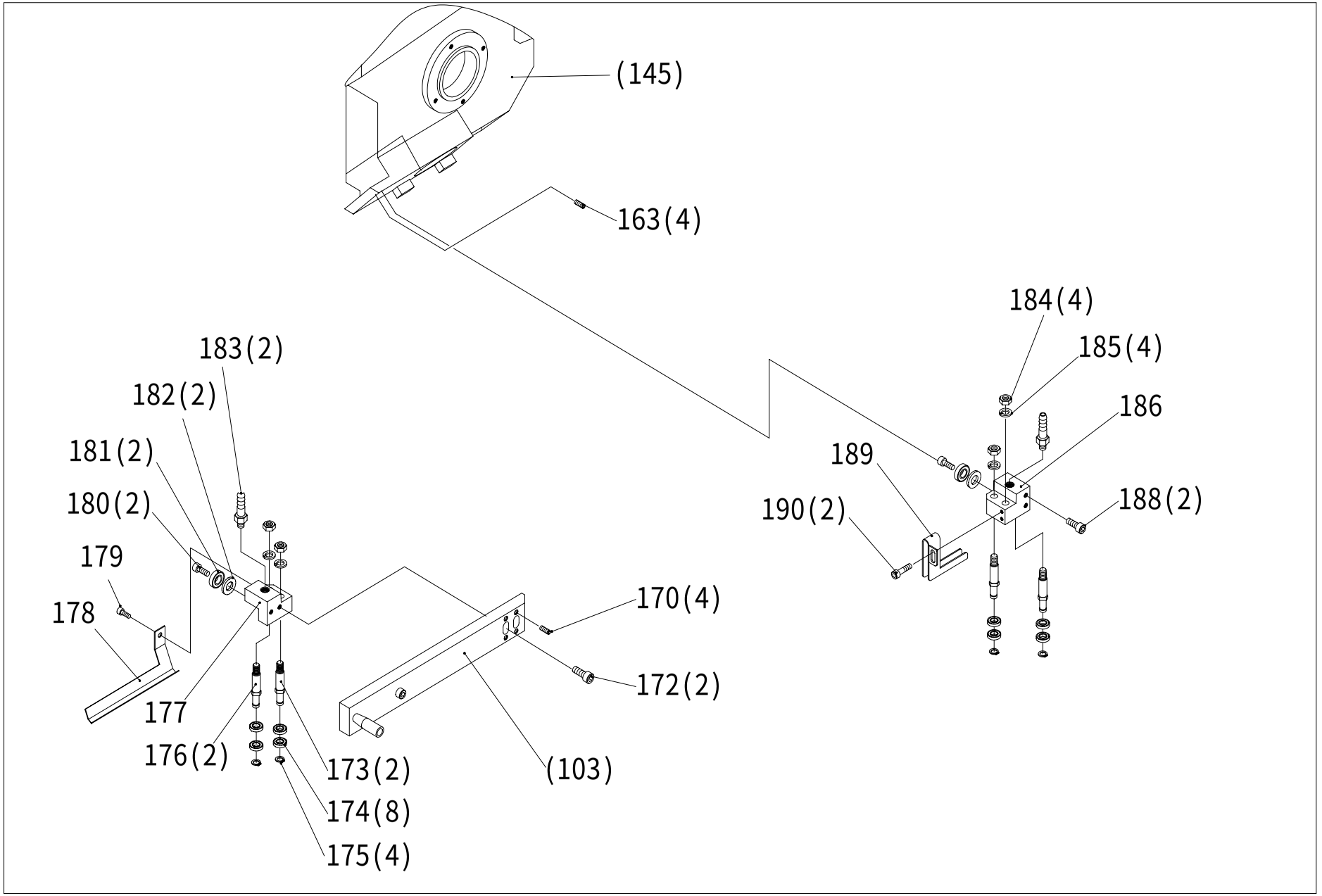
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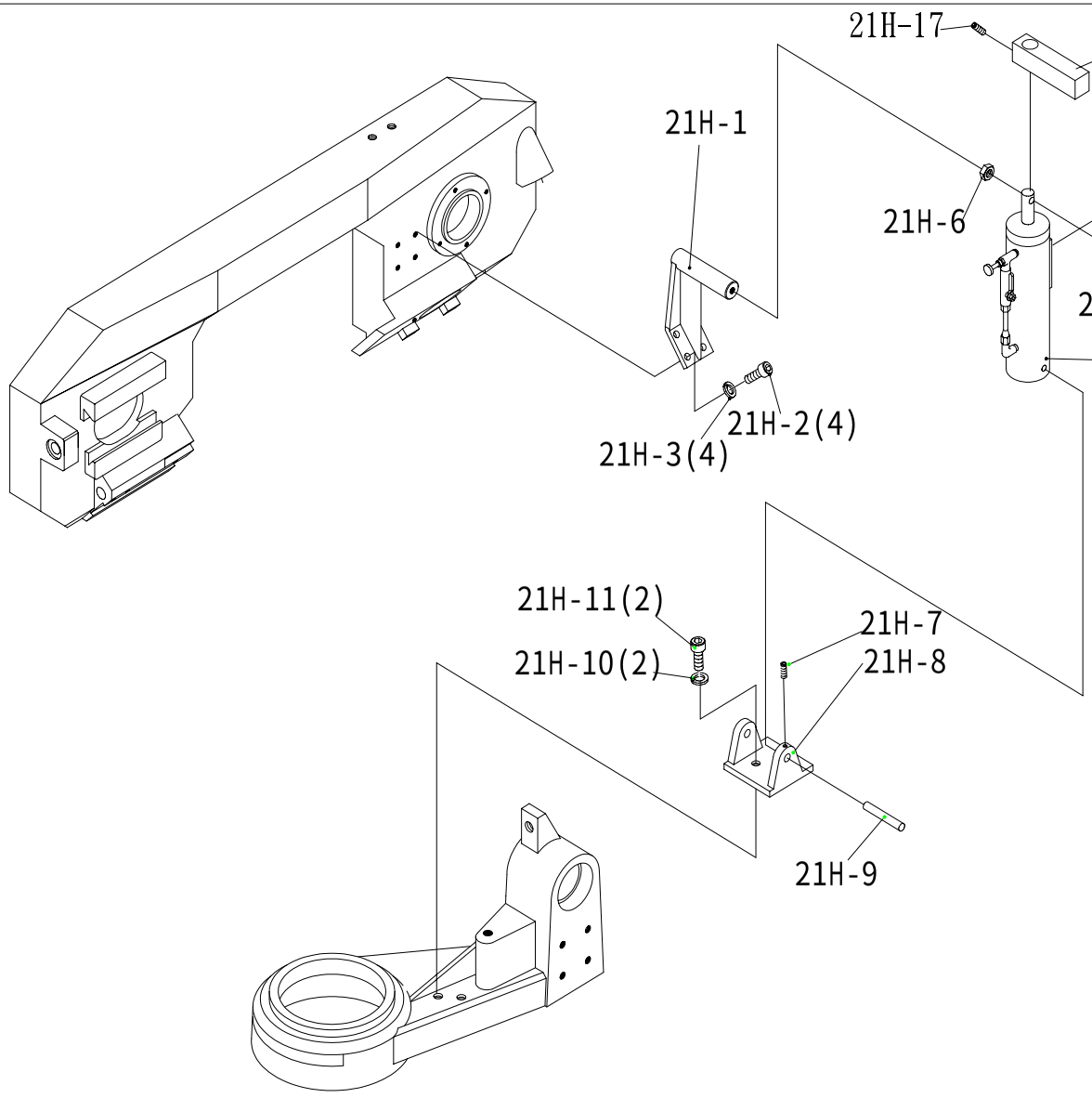

Part No.	Description	Size No.	Q'ty
1	Top Support		1
2	Hex. Socket Cap Screw	M8x20	4
3	Spring Washer	M8	4
4	Hex. Socket Cap Screw	M10x40	1
5	Hydraulic Cylinder		1
6	Nut	M10	1
7	Set Screw	M6x12	1
8	Bottom Support		1
9	Support Rod		1
10	Spring Washer	M8	2
11	Hex. Socket Cap Screw	M8x20	2
12	Round Head Screw	M5x10	2
13	Limit Switch		1
14	Hex. Socket Cap Screw	M6x8	2
15	Adjusting Bracket		1
16	Setting Bracket		1
17	Set Screw	M6x12	1